

unevennesses. For ordinary work a Gillott 303 pen and for light lines (representing silky pubescence for instance) a Gillott 290 will be found about the right size. For the beginner outline drawings alone may suffice. Shading should be put in first with pencil until the desired effect is produced, the object being placed in such position as to make the shadows show the form to best advantage. When the surface permits of its use, stippling is the easiest way of shading. The pencil lines are erased from the finished drawing by a soft rubber, such as "Erasit" or "Artgum." One soon learns to take advantage of veining, scabridity, pubescence, etc., in expressing form and texture. Ideas may be gained by carefully studying the successful representation of particularly difficult subjects, as for instance, the heads of *Antennaria* and the *Xanthium* burs in Gray's Manual, 7th edition. I know of nothing more difficult to represent naturally in pen and ink than white pubescence or pappus, and spines, awns or hairs standing straight out. If such drawings are studied through a magnifying glass a better idea of the workmanship is obtained. The illustrations of the willows are good examples of stippling and pubescence used for shading. It is not meant to suggest that one should imitate these drawings but should study them to gain ideas only. If one is able to bestow any art on his drawing so much the better but it is the truthful, even if crude, illustration that is of value. In whatever tongue a description is published an accurate illustration speaks in every language, and drawing is well worth cultivating as a method of expressing the truth as we see it.

BUREAU OF PLANT INDUSTRY, Washington, D. C.

THE NORTHERN VARIETY OF *GAYLUSSACIA DUMOSA*.

M. L. FERNALD.

IN June, 1910, Professor Wiegand and the present writer, in discussing a typical sphagnum bog of the coast of eastern Maine, said:

"Practically all the vascular plants of this Quoddy Head heath were such as one would expect above tree-line on Mt. Katahdin or Mt. Washington or in the subarctic tundra of Labrador — *Scirpus caespitosus* L., *Carex pauciflora* Lightf., *Comandra livida* Richardson, *Rubus Chamaemorus* L., *Empetrum nigrum* L., *Vaccinium pennsylv-*

vanicum Lam., var. *angustifolium* (Ait.) Gray, *Aster radula* Ait., var. *strictus* (Pursh) Gray, etc.—but the most conspicuous plant at the time of our visit was *Gaylussacia dumosa* (Andr.) T. & G., forming dense depressed shrubs only 1 or 2 decimeters high, closely embedded in the *Sphagnum*, and loaded with beautiful white or pink-tinged bells. The distribution of this very distinct *Gaylussacia* is notable, for it occurs in bogs and wet swamps all the way from Newfoundland to Louisiana, in New England at least rarely extending far from the coast. Yet the plants with which it is associated in the Lubec bog and elsewhere in eastern Maine are chiefly polar types which do not extend far southward into the temperate areas of eastern America.”¹

At the time of writing this note our comparison of the northern and southern specimens of *Gaylussacia dumosa*, though revealing a slight habital difference, showed nothing more tangible by which the northern and southern extremes of the species could be separated. Later, in a letter Dr. R. M. Harper called attention to the fact that in the South *G. dumosa*, which in the North is a shrub of sphagnum bogs, occurs in dry barrens, and a search of literature as well as an inspection of herbarium labels emphasizes this fact. Thus Michaux, mistaking *G. dumosa* (*Vaccinium dumosum* Andrews) for the Linnaean *V. frondosum*, described it as growing “in pinetis, aridis, a Virginia ad Floridam”;² Pursh taking it up as *Vaccinium dumosum* said that it grew “in dry sandy woods, particularly pine-forests: New Jersey to Florida.”³ Elliott said it “grows in dry, sandy soils,”⁴ and more recently Mohr has defined its habitat in Alabama as “Dry barren siliceous soil”⁵ and its general distribution in the South as “Rare in the mountains, abundant in the dry pine barrens of the coast region.”⁵ Chapman, however, gives a slightly different account: “Low sandy pine barrens and swamps,”⁶ and though the labels of a very few herbarium specimens from North Carolina and Florida read: “low grounds” or “border of marsh,” the great majority of specimens are from dry habitats.

In the more northern coastal states and the Maritime Provinces we find the habitat stated as follows. By Jacob Bigelow who took the northern plant to be Aiton’s southern *Vaccinium hirtellum* it was found “In the edge of Richards’ pond, Brookline [Massachusetts]”,⁷

¹ RHODORA, xii. 106, 107 (1910).

⁴ Ell. Sk. Bot. S. Car. and Ga. i. 497 (1821).

² Michx. Fl. Bor. Am. i. 230 (1803).

⁵ Mohr, Plant Life of Alabama, 657 (1901).

³ Pursh, Fl. Am. Sept. i. 285 (1814).

⁶ Chapm. Fl. 258 (1860).

⁷ Bigelow, Fl. Bost. ed. 2, 152 (1824).

and Bigelow made the discriminating observation: "Very nearly allied to *V. dumosum* of Pursh, and perhaps only a variety. Its aquatic growth and hirsute berries, which I do not find mentioned by American botanists, have led me to separate it from that species, with which it is usually considered synonymous."¹ Torrey, treating *Vaccinium dumosum* Andr. as synonymous with *V. hirtellum* Ait., took them both up as *Gaylussacia hirtella* (Ait.) T. & G. and stated that in New York it grew in "borders of ponds, and in wet sandy soils,"² Fowler in his *Plants of New Brunswick* listed it only from "a peat bog."³ Rand & Redfield found it on Mt. Desert Island only "in sphagnum bogs"⁴ and the Connecticut Flora lists it only from "sphagnum bogs."⁵ Similarly all the material in the Gray Herbarium from Newfoundland, New Brunswick, Nova Scotia and New England, and in the herbarium of the New England Botanical Club, comes from sphagnum bogs, boggy margins of ponds or similar habitats; never from dry soil.

As a general rule the bog- and humus-plants of southern New England occur on our mountains or in northern Maine or eastern Quebec in drier habitats than with us but only a few species (*Cypripedium acaule*, *Pyrola americana*, *Epigaea repens*, *Gaultheria procumbens*, etc.) of our silicious or acid soils reverse the principle and northward seek the sphagnum bogs and wet mossy woods. And whenever this singular reversal of habitats is noted we naturally inquire if there may not be some specific or varietal distinction between the northern and southern plants. In some cases no very apparent difference is found and in *Gaylussacia dumosa* the only striking difference which at first appears is that, as a rule the southern plant has narrower leaves than the northern—generally oblanceolate in outline, while the leaves of the northern plant tend more to be elliptic- or oblong-ovate; but this is only a tendency and breaks down in a long suite of specimens. A close study of the two series, however, shows that in the northern plant the leaves and the bracts of the inflorescence are always copiously glandular-dotted on both surfaces, while in the southern plant of dry soils the upper faces of the leaves and bracts are usually quite glandless, though occasionally glandular when first

¹ Bigelow, *Fl. Bost.* ed. 2, 152, (1824).

² Torr. *Fl. N. Y.* i. 448 (1843).

³ Fowler, *Prelim. List Pl. N. B.* 41 (1885).

⁴ Rand & Redfield, *Fl. Mt. Desert*, 124 (1894).

⁵ *Ct. Geol. Nat. Hist. Surv. Bull.* xiv. 312 (1910).

expanded. In the intermediate belt, in eastern Pennsylvania for instance, the specimens are quite transitional in this character. In general, too, the calyx-lobes of the southern plant have smoother surfaces than in the northern, but this character is less obvious than is the presence or absence of glands upon the upper surfaces of the mature leaves and bracts. In this latter point the northern bog plant is so readily distinguished from the southern plant of dry sands that it seems best to separate them varietally. But when we approach the question of determining which was the original *Gaylussacia dumosa* we encounter some difficulty. The species, first designated as *Vaccinium dumosum* by Andrews in 1800, was inadequately described, the English reading: "Whortle-berry with oval, pointed, smooth leaves; flowers grow solitary from the foot-stalk of the leaves, close to the stem; foot-stalks of the flowers are very long, having floral leaves; blossoms pitcher-shaped, nearly white; ten chives."¹ The colored plate is very crude and shows neither pubescence nor glands upon the foliage, branchlets or even the calyx, so that it is impossible to say from the plate and description which extreme of the species Andrews had. In the note following the description, however, occurs the significant statement:—

"THIS species of Whortle-berry is a neat, compact, bushy shrub; and like all the rest of those which have ten chives, and the other parts consonant, can scarcely be considered as a hardy plant; for although it will live through a mild winter, if planted in a warm and dry situation, on an open border; yet it will in general be destroyed, by the severe frosts which happen late in spring. . . . As a hardy greenhouse plant it is best preserved in a flourishing state, and will flower about the month of June; in which month, this year, our drawing was made, at the nursery of Messrs. Lee and Kennedy, by whom it was introduced from North America in the year 1783."

From this note it seems most probable that *Vaccinium dumosum* was based upon the southern shrub of dry soils. The name was thus used by Pursh and other early American botanists, and as already noted the northern bog plant was treated by Jacob Bigelow as distinct, although the name he used for it unfortunately belonged to a southern extreme of the same group. In default of better evidence in the matter it seems best to treat the southern plant as typical

¹ Andrews, Bot. Rep. ii. t. 112 (1800).

Gaylussacia dumosa while the shrub of our northern bogs may appropriately bear the name

GAYLUSSACIA DUMOSA, var. **Bigeloviana**, n. var. A forma typica recedit foliis fere elliptico-vel oblongo-obovatis usque utrinque glandulosis, bracteis utrinque copiose glandulosis.

Differing from the typical form in having the leaves commonly elliptic- or oblong-obovate, permanently glandular on both faces, and in having the bracts of the inflorescence permanently and copiously glandular above as well as beneath.—Sphagnum bogs, wet heaths, and boggy pond-margins, Newfoundland to Connecticut, and probably slightly southwestward. TYPE: heath at base of West Quoddy Head, Lubec, Maine, July 26, 1909, *Fernald & Wiegand* (*Fernald*, no. 2038 in Gray Herb). Other specimens examined — NEWFOUNDLAND: as *Vaccinium frondosum*, without definite locality, *la Pylaie*; edges of bogs, Whitbourne, August 16, 1894, *Robinson & Schrenk*, no. 201; heaths overlying carboniferous area, Stephenville Crossing, August 14, 1910, *Fernald & Wiegand*, no. 3853: "rich rocky soil", hillside, Channel, July 27–Aug. 1, 1910, *Howe & Lang*, no. 872. NEW BRUNSWICK: Kent County, July 14, 1870, *J. Fowler*. NOVA SCOTIA: Smoky Mt., Cape Breton Island, August 8, 1898, *J. Macoun*, no. 19,775; Canso, July 26, 1901, *J. Fowler*. MAINE: "Bangor Bog," Orono, 1880, *Kate Furbish*; growing with *Empetrum nigrum*, *Rubus Chamaemorus*, etc., Lubec, 1828, *Wm. Oakes*; Jonesport, *F. H. Peabody*; bog, Somesville, September 20, 1892, *M. L. Fernald*; Great Marsh, Great Cranberry Isle, Aug. 27, 1889, *E. L. Rand*, July 20, 1899, *E. F. Williams*; bog, Manchester, July 7, 1874, *F. L. Scribner*; Town Bog, Wells, July 11 and Sept., 1898, *Kate Furbish*; Wells Beach, 1898, *Kate Furbish*. NEW HAMPSHIRE: Muddy Pond, Pautuckaway Mt., Nottingham, September 15, 1899, *A. A. Eaton*. MASSACHUSETTS: pond, Tewksbury, June 23, 1853, *Wm. Boott*; Long Pond, Melrose, June, 1880, *H. A. Young*; sphagnum around Muddy Pond, Stony Brook Reservation, June 17, 1895, *W. P. Rich*, Aug. 23, 1896 and June 26, 1897, *E. F. Williams*; Hammond Pond, Newton, June 9, 1854, *Wm. Boott*; Muddy Pond, Dedham, August 18, 1854, *Wm. Boott*. RHODE ISLAND: South Kingston, *S. T. Olney*. CONNECTICUT: peat swamps, Southington, June 23 and September 1, 1897, *C. H. Bissell*, no. 385, June 7, 1899, *L. Andrews*, no. 798; open sphagnum bog, Litchfield, June 26, 1906, *C. H. Bissell*; Bethany, July 5, 1886, *E. B. Harger*.

GRAY HERBARIUM.